

REMARKS

This Application has been carefully reviewed in light of the first Office Action mailed July 8, 2008 (the “Office Action”). Claims 1-28 and 41-52 were pending, Claims 29-40 and 53-104 were withdrawn. Claims 1-28 and 41-52 were rejected in the Office Action. Applicant respectfully request reconsideration and allowance of all pending claims.

Amendments to Drawings

The Examiner has requested that Figures 1-3 should be designated as “Prior Art.” The attached sheets of drawings include, a REPLACEMENT SHEET showing revised Figures 1-3 and an ANNOTATED SHEET showing the changes made to Figures 1-3. The REPLACEMENT SHEET, which includes Figures 1-3, replaces the original sheet showing Figures 1-3.

Attachments: Exhibit A - REPLACEMENT SHEETS

Exhibit B - ANNOTATED SHEETS

Section 103 Rejections

The Examiner rejects Claims 1-28 and 41-52 under 35 U.S.C. § 103(a) as being unpatentable over “The computer simulation of the interaction between roller bit and rock” by Ma et al. (“*Ma '95*”) or “The operational mechanics of the rock bit” by Ma (“*Ma '96*”) in view of Applicant’s admitted prior art. Applicant respectfully traverses these rejections.

Claim 1 is directed to a method for designing a roller-cone earth-penetrating drill bit. The method comprises simulating the unconstrained motion of cones of a roller-cone earth-penetrating drill bit, including the trajectories of teeth thereof through rock being drilled. The method further comprises, for multiple respective ones of said teeth, both adjusting a respective crest orientation thereof, in accordance with the general direction of the trajectory of said tooth in a plane normal to the wellbore axis, and also adjusting an axis of said tooth in accordance with the angle at which said tooth indents said rock at the start of said trajectory of said tooth.

First, Applicant respectfully submits that neither *Ma '95*, *Ma '96*, nor Applicant’s Specification, alone or in combination, disclose, teach, or suggest each of the limitations of Claim 1. In fact, the Examiner acknowledges that neither *Ma '95* nor *Ma '96* expressly teach

“varying the specific types of teeth and their specific various locations and orientations as recited in the claims.” *Office Action*, pg. 4. In fact, *Ma* ’96 does make reference teeth spacing and crest orientation. *Ma* ’96, pg. 231. However, *Ma* ’96 makes no mention whatsoever of adjusting an axis of a tooth. *Ma* ’95 similarly fails to teach, disclose, or even suggest adjusting an axis of a tooth. However, the Examiner goes on to state that the Background section of Applicant’s own Specification teaches “the variations of [the teeth’s] possible locations and orientations.” *Office Action*, pg. 4. Applicants respectfully disagree. While Applicant’s Background does discuss roller cone bit design and tooth design in general, there is no mention whatsoever of adjusting an axis of a tooth. To this end, Applicant respectfully contends that, while the references disclose various aspects of bit design, there is no teaching, disclosure, or suggestion of adjusting an axis of a tooth in accordance with the angle at which said tooth indents rock at the start of a trajectory of the tooth.

Additionally, the Examiner states that “[n]othing inventive has been produced by varying the types of teeth and their various locations and orientations via *routine testing* (optimization) of a design.” *Office Action*, pg. 4. Purporting to rely on *Pfizer v. Apotex*, 480 F.3d 1348 (Fed. Cir. 2007), the Examiner states that such “routine testing” would have been obvious to one of ordinary skill in the art. *Office Action*, pg. 5. Applicant respectfully disagrees.

To begin with, the court in *Pfizer* does not rely on a broad rule that “routine experimentation” negatives patentability. In fact, the court criticizes rigid application of such “rules” without regard to the particularized facts of a case. *Pfizer* at 1367. In fact, the court cites to *In re Fay*, 347 F.2d 597, 602 (C.C.P.A. 1965), which states that the teachings of the art control determinations of obvious, and “[w]hether the subsequent experimentation is termed ‘routine’ or not is of no consequence.” *Pfizer* at 1367 (citing *In re Fay*).

Looking to the “particularized facts” of the case, the court in *Pfizer* did consider the routine testing because the prior art “predicted the results.” *Pfizer* at 1367. Several factors supported this decision. First, in that case, there was only one single parameter to be varied during experimentation. *Pfizer* at 1366. Second, in prior litigation, Pfizer had conceded that the type of salt—the parameter in question—was practically interchangeable. *Id.* Finally, the prior art provided very narrow guidance in providing a very small list of types of salt that

could be used during experimentation. *Id.* Based on all of these particularized facts, the court in *Pfizer* found the optimized salt to be obvious.

In contrast, the particularized facts surrounding the present Application fail to show that the elements of Claim 1 are obvious or that a method for designing a bit using simulation is mere routine testing. To begin with, *Ma '96* repeatedly discusses the great complexity of drill bit design, taking into a myriad of factors including applied force, stress, strain, wear, speed, and material of multiple components, including the various drill cones and their respective teeth, not to mention the makeup of the rock being drilled. *See Ma '96*, pg. 12. Thus, computer simulation is far from the “routine testing” of one single variable parameter. Additionally, *Ma '96* also discloses that, even with advances in bit simulation, parts of the drilling process remains “highly stochastic” and unpredictable. *See Ma '96*, pg. 233. Finally, as discussed above, none of the cited references teach, disclose, or suggest adjusting an axis of a tooth. As such, one of ordinary skill in the art would not have a “finite number of identified, predictable solutions,” as the Office Action contends. *Office Action*, pg. 6. For at least these reasons, Applicant respectfully requests reconsideration and allowance of Claim 1.

Similar to Claim 1, independent Claims 17 and 41 include limitations generally directed to adjusting an access of a tooth in accordance with the direction at which the tooth indents rock at the start of a trajectory. Dependent Claims 2-16, 18-28, and 42-52 incorporate all the limitations of their respective base Claim. Accordingly, for at least the same reasons discussed above with regard to Claim 1, Applicant respectfully requests reconsideration and allowance of Claims 1-28 and 41-52.

Information Disclosure Statement

The Examiner notes that several references listed in Applicant's remarks of 10/9/2007 do not appear to have been cited in an IDS. Concurrent with this response, Applicant respectfully submits an IDS listing these references. Applicant appreciates the Examiner's consideration of these references.

CONCLUSION

Applicant has made an earnest attempt to place this case in condition for allowance. For at least the foregoing reasons, Applicant respectfully requests full allowance of all pending claims.

If the Examiner feels that a telephone conference would advance prosecution of this Application in any manner, the Examiner is invited to contact the undersigned Attorney for Applicant, at the Examiner's convenience at (214) 953-6655.

Filing concurrently herewith are a three-month Notice of Extension of Time with fee and an Information Disclosure Statement also with fee. Applicant believes no other fees are due, however, if there are any additional fees, the Commissioner is authorized to charge the additional fees or credit any overpayments to Deposit Account No. 02-0384 of BAKER BOTT'S L.L.P.

Respectfully submitted,

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APPENDIX A